## REMARKS

This Amendment is in response to the Office Action mailed July 13, 2004. Claims 1-115 are pending, with claims 22 and 95-104 having been withdrawn, and claims 1-21, 23-94 and 105-115 rejected in the present Office Action.

Claims 1, 23, 42, 49, 72, 85, and 105 have been amended in this response.

### Information Disclosure Statement

Applicants respectfully note that an initialed copy of the PTO-1449 form filed June 8, 2004 has not been returned. Thus, Applicants respectfully request return of an initialed copy. For the Examiner's convenience, a copy of the PTO-1449 form filed June 8, 2004 is attached hereto. In addition, a copy of the listed reference can be resubmitted upon request.

### Double Patenting Rejection

Claims 1-21, 23-94, and 105-114 have been provisionally rejected under the judicially-created doctrine of obviousness-type double patenting. The Applicants will consider an appropriate terminal disclaimer if allowable subject matter is indicated.

### Rejections under 35 U.S.C. § 103 over Brown or Stabile in view of Che

Claims 1-21, 23-94, and 105-112 stand rejected under 35 U.S.C. § 103 over U.S. Publication 2003/0133009 to Brown et al. ("Brown") or U.S. Patent 5,872,623 to Stabile ("Stabile") in view of U.S. Patent 6,140,653 to Che ("Che"). Claims 1, 23, 42, 49, 72, 85, and 105 are the independent claims of this group.

Brown discusses a system for detecting visual information in arrays of material using a relatively complicated system. First, the Brown system uses a "high numerical aperture lens" to collect light from a sample and direct it properly onto a light detector. This lens adds complexity to the system. In addition, the Brown system uses a light detector that is smaller than the image to be detected in both the X dimension and the Y dimension (i.e., it is both narrower ***and*** shorter than the image), and then joins the acquired images together in a grid of images. Thus, the

Brown system is able to reduce some complexity and expense by using a detector that is smaller than would otherwise be required, but the Brown system introduces additional complexity in the form of additional structure that is needed to accurately position the sample or the detector in two different dimensions, and in the use of the lens.

As for Stabile, that reference discusses a system for detecting light from a large number of liquid wells. As shown in the figures of the Stabile patent and discussed in the corresponding description, the entire image of the liquid wells is either focused downward by a lens or lenses (*see, e.g.*, Figs. 1A, 3A, 3B, 4, 6, and 7) onto an imaging apparatus, or CCD pixel grids are directly associated with certain wells. In each case, each well is a separate image and is treated separately by the system, since the test results of a liquid in a well need not be associated visually with those in other wells.

Pending claim 1 as amended, in contrast, recites a system for detecting biological material of a biological sample using a light detector array and control circuitry to acquire one or more frames of image data representative of a full-width sub-portion of the biological material. Importantly, the system here is obtaining frames of data that are but a sub-portion of the material – not a plurality of images directly associated with each of a number of wells as in Stabile. These frames, however, span the full width of the material that is to be imaged, unlike in Brown. As a result, the movement of the sample or detector is much easier than that in Brown, as the structures need only be moved back and forth. Such action can be readily provided, in one example, by placing the detector on a fixed rod or rail, and driving it with a motorized screw drive. This is a very stable, simple, and predictable movement mechanism that avoids the complexity required in the Brown system. As a result, the instant invention can allow for a system that is smaller, less expensive, lower in maintenance requirements, and more durable than a system like that discussed in Brown. Brown does nothing to suggest such a system, and Applicants therefore respectfully submit that claim 1 as amended is in condition for allowance.

As for Stabile, it acquires many different distinct images for each well of material, while claim 1 acquires only a single large image having multiple frames in it. In this manner, the frames can be placed together in the end, and the entire image analyzed or taken back apart. This

method shifts much of the work from the scanning function to the analysis function, and allows greater flexibility in dealing with the acquired data because the entire image is provided, so that the analysis software can determine how to break it up. In contrast, the Stabile system breaks up the wells when imaging them, so that downstream processes do not have the capability to deal with the information flexibly. Thus, with respect to amended claim 1, Stabile does not fill in for the failings of Brown to disclose or suggest the invention.

Che does not plug the holes left by Stabile or Brown. The Office Action relies on Che simply as disclosing a sample holder. Even if Che discloses such structure, it does not contain all the other features of amended claim 1 so as to cure the problems with the Brown publication or the Stabile patent. It also does not show the features, such as control circuitry to acquire data representative of a full-width sub-portion of the imaged biological material. For these reasons, the Applicants respectfully submit that claim 1 and its dependent claims are in condition for immediate allowance.

Independent claims 23, 42, 49, as amended, recite similar features as those discussed above for claim 1. Also, claim 85 recites similar features and a "means" that incorporates the structures for processing such data that represents only a portion of an image. For the reasons discussed above with respect to amended claim 1, the Applicants respectfully suggest that these claims and the claims that depend on them are in condition for immediate allowance.

Independent claim 72, as amended, recites a device for detecting a pattern of polynucleic acid hybridization comprising a polynucleic acid chip at a sampling position, and an electronic light detector array, where the sampling position places the chip's sample surface in a defined spatial relationship relative to the array such that light is directed without modification onto at least one detector pixel. Thus, the light passes without being compressed downward by a lens, but is instead passed directly to the detector array. As noted above, Brown uses an objective lens to modify the path of the light coming from the sample, and Che discusses only a sample holder at most. For Stabile, the only sort of samples discussed is samples in liquid wells – which are much larger than the locations on a polynucleic acid chip. Because of this, Stabile shows for the most part embodiments using lenses or other similar structures to "shrink" the size of the

substrate holding the liquid wells down to the size of the detector array; it does not pass the light directly without modification, as recited in pending claim 72. Therefore, Applicants submit that claim 72 and the claims that depend on it are in condition for immediate allowance.

In a similar manner, independent claim 105 recites a position of the sample relative to that of a light detector that establishes a plurality of substantially parallel light paths (e.g., that have not been altered by a lens). For the reasons just discussed for claim 72, the Applicants submit that claim 105 is in condition for allowance.

Rejections under 35 U.S.C. § 103 over Brown or Stabile in view of Che and Rushbrooke

Claims 113-115 stand rejected under 35 U.S.C. § 103 over U.S. Publication 2003/0133009 to Brown et al. ("Brown") or U.S. Patent 5,872,623 to Stabile ("Stabile") in view of U.S. Patent 6,140,653 to Che ("Che") and U.S. Patent to Rushbrooke ("Rushbrooke"). Claim 113 is the independent claim in this group. It recites a system for detecting a biological material comprising a positioning structure, an electronic light detector array, and a bundled fiber optic light source having certain features and providing light to the sample, and control circuitry to control scanning of the biological sample. The Office Action relies on Rushbrooke as showing such a fiber optic array. Rushbrooke, however, is a wholly different structure and arrangement. Specifically, Rushbrooke uses "a plurality of light-guides" to pass light that is *output* from the sample to the light detector. *See, e.g.,* Rushbrooke, column 9, lines 63-68. Rushbrooke does not disclose use of optical fibers. More importantly, pending claim 113 recites fiber optic to pass light *input* to the sample from the light source, not to collect light emitted from the sample. Indeed, the light from the sample may be so low (and much lower than the level of light from a normal light source) that the use of solid components to pass the light would reduce its intensity to such an extent that it would not provide accurate measurements. Thus, the feature used on the Rushbrooke machines is completely different than that recited in pending claim 113, and the Applicants request quick allowance of that claim, and claims 114-115 which rely upon it.

For each of these reasons, Applicants respectfully suggest that the claims are in condition for immediate allowance. Attached to the Petition for Three-Month Extension of Time is a check in the amount of $510. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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